

LISTING OF CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in this application.

1. (currently amended) A device for connecting a longitudinal carrier to a bone fixation means, the device comprising:

a connection element having a central axis, an external surface, an upper end, a lower end, a cavity extending coaxially along the central axis from the upper end to the lower end, the cavity having a reduced diameter portion at the lower end forming at least one shoulder therein, and a first channel passing through the connection element transversely to the central axis for receiving the longitudinal carrier;

a sealing cap having a front end, a rear end, a second cavity opening at the front end for receiving the connection element, and a second channel extending transversely to the central axis and opening towards the front end of the sealing cap; and

tensioning means for engaging the rear end of the sealing cap for securing the position of the longitudinal carrier inserted in the first channel; wherein:

the external surface of the connection element and the internal surface of the second cavity formed in the sealing cap include complementary arresting means for securing the sealing cap to the connection element, the complementary arresting means extending continuously, concentrically, and non-threadingly around the central axis on the connection element external surface and the sealing cap internal surface, the concentric continuity of the arresting means interrupted by the first and second channels, and

the device further includes securing means to prevent the bone fixation means from passing through the cavity prior to attachment of the sealing cap to the connection element,
wherein the complementary arresting means includes complementary non-threaded projections and recesses for securing the sealing cap to the connection element, the projections and recesses providing a plurality of discrete axial latch positions parallel to the central axis, each successive latch position axially displacing the sealing cap over the connection element.

2. (original) The device according to claim 1, wherein the arresting means are arranged orthogonal to the central axis on the periphery of the connection element and on the periphery of the second cavity in the sealing cap.

3. (previously presented) The device according to claim 2, wherein the arresting means includes a plurality of bulges formed on the external surface of the connection element and a plurality of complementary depressions formed in the second cavity of the sealing cap, the plurality of bulges and the plurality of depressions each aligned parallel to the central axis.

4. (original) The device according to claim 1, wherein the shoulder has a level bearing surface of circular-ring shape.

5. (original) The device according to claim 1, wherein the sealing cap further includes two slots arranged orthogonal to the second channel, the slots extending from the front end of the sealing cap.

6. (original) The device according to claim 1, further comprising bone fixation means having a central axis, a front segment, and an axially adjoining rear segment, wherein the rear segment has a

cylindrical form for engaging the shoulder, and the front segment extends through the lower end of the connection element for engaging a bone.

7. (original) The device according to claim 6, wherein the bone fixation means is a pedicle screw with a screw shaft having an external thread and a screw head at an end thereof.

8. (previously presented) The device according to claim 1, wherein the tensioning means comprises a set screw.

9. (previously presented) The device according to claim 1, wherein the securing means comprises a pin, and the connection element has a hole extending into the connection element from the cavity and transverse to the central axis, the pin sized and configured to be pressed into the hole.

10. (previously presented) The device according to claim 1, wherein the securing means comprises a snap ring sized and configured to be received within a corresponding groove formed on the bone fixation means.

11. (currently amended) A device for connecting a longitudinal carrier to a bone fixation means, the device comprising:

a connection element having a central axis, an external surface, an upper end, a lower end, a cavity extending coaxially along the central axis from the upper end to the lower end, the cavity having a reduced diameter portion at the lower end forming at least one shoulder therein, and a first channel passing through the connection element transversely to the central axis for receiving the longitudinal carrier;

a sealing cap having a front end, a rear end, a second cavity opening at the front end for receiving the connection element, and a second channel extending transversely to the central axis and opening towards the front end of the sealing cap; and

tensioning means for engaging the rear end of the sealing cap for securing the position of the longitudinal carrier inserted in the channel with respect to the connection element; wherein:

the external surface of the connection element and the internal surface of the second cavity formed in the sealing cap ~~have complementary non-threaded projections and recesses~~ include complementary arresting means for securing the sealing cap to the connection element, wherein the complementary arresting means includes non-threaded projections and recesses, the projections and recesses providing a plurality of discrete axial latch positions parallel to the central axis, each successive latch position axially displacing the sealing cap over the connection element, and wherein the complementary arresting means extends continuously, concentrically, and non-threadingly around the central axis on the connection element external surface and the sealing cap internal surface, the concentric continuity of the arresting means interrupted by the first and second channels.

12. (previously presented) The device of claim 11 wherein the projections and recesses comprise:

a plurality of bulges formed on the external surface of the connection element, the bulges aligned parallel to the central axis; and

a plurality of complementary depressions formed in the second cavity of the sealing cap, the depressions aligned parallel to the central axis.

13. (previously presented) The device of claim 11 further comprising bone fixation means having a central axis, a front segment, and an axially adjoining rear segment, wherein the rear segment has a cylindrical form for engaging the shoulder, and the front segment extends through the lower end of the connection element for engaging a bone.

14. (previously presented) The device of claim 13 wherein the bone fixation means comprises a pedicle screw with a screw shaft having an external thread and a screw head at an end thereof.

15. (previously presented) The device of claim 11 wherein the tensioning means comprises a set screw.

16. (previously presented) The device of claim 11 further comprising securing means to prevent the bone fixation means from passing through the cavity prior to attachment of the sealing cap to the connection element.

17. (previously presented) The device of claim 16 wherein the securing means comprises a pin, and the connection element has a hole extending into the connection element from the cavity and transverse to the central axis, the pin sized and configured to be pressed into the hole.

18. (previously presented) The device of claim 11 wherein the projections and recesses have a saw-tooth shaped profile when viewed in a cross-section surface parallel to the central axis.

19. (currently amended) A device for connecting a longitudinal carrier to a bone fixation means, the device comprising:

a connection element having a central axis, an external surface, an upper end, a lower end, a cavity extending coaxially along the central axis from the upper end to the lower end, the cavity having a reduced diameter portion at the lower end forming at least one shoulder therein, and a first channel passing through the connection element transversely to the central axis for receiving the longitudinal carrier;

a sealing cap having a front end, a rear end, a second cavity opening at the front end for receiving the connection element, and a second channel extending transversely to the central axis and opening towards the front end of the sealing cap; and

tensioning means for engaging the rear end of the sealing cap for securing the position of the longitudinal carrier inserted in the channel with respect to the connection element; wherein:

the external surface of the connection element has a plurality of bulges formed thereon, the plurality of bulges aligned parallel to the central axis;

the internal surface of the second cavity formed in the sealing cap has a plurality of depressions formed therein, the plurality of depressions aligned parallel to the central axis and complementary to the plurality of bulges; and

the sealing cap is sized and configured to engage the connection element such that each bulge of the connection element is operative to snap-fit into at least one depression of the sealing cap, the bulges and depressions providing a plurality of discrete axial latch positions parallel to the

central axis, each successive latch position axially displacing the sealing cap over the connection element, wherein the bulges and depressions extend continuously, concentrically, and non-threadingly around the central axis on the connection element external surface and the sealing cap internal surface, the concentric continuity of the bulges and depressions interrupted by the first and second channels.

20. (previously presented) The device of claim 19 wherein the bulges and depressions have a saw-tooth shaped profile when viewed in a cross-section surface parallel to the central axis.